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Announcement of an LCA Case Study

Life Cycle Assessment for Lithium and Lithium Compounds

Lithium, a light metal, is getting increasingly important in different sectors of the economy. It can, for example, be used for batteries or in metal alloys. The environmental consultancy ESU-services has investigated the environmental impacts of lithium production in a life cycle assessment (LCA) study. The first part of this study gives general information for lithium production. The resources, production and uses are described. The chapter also provides an overview of the major companies in the market. The environmental impacts of lithium production are investigated in the second part from cradle to gate in a life cycle assessment (LCA). The inventory is split up into four main stages according to the intermediate products of lithium processing: concentration of lithium brine in South America, production of lithium carbonate, lithium chloride and metallic lithium. Additionally, water pumps and the production of potassium chloride are investigated

for the inventory. Internal data for the environmental impacts of production processes of the two major producers of lithium were not available. Thus, the study mainly uses published information. About 700MJ-eq of non-renewable energy resources are used to produce one kilogram of lithium. Major energy uses in the life cycle arise from the electrolysis of lithium metal and from the use of soda and hydrogen chloride in processing. The environmental impacts for the pre-products lithium carbonate and lithium chloride are much lower than for the metallic lithium. The mining of lithium in South American deserts could also have important local effects on the groundwater level that cannot be accounted for with the LCA method and its 'global view'. The results of the inventory are meant to be used in LCA studies of technical products, such as batteries, where lithium or lithium compounds are one of the necessary materials.

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